

# PATENT SPECIFICATION

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DRAWINGS ATTACHED

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## 54) IMPROVEMENTS IN OR RELATING TO CONTAINERS FOR STORING AND DISPENSING MEDICINAL LIQUIDS

71) We, B. BRAUN INTERNATIONAL n.b.H., a limited liability Company, organised under Swiss Law of 14 Tiergartenstrasse, Liestal, Switzerland, do hereby declare the invention, for which we pray that patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

his invention relates to a container made of physiologically acceptable plastics for the storage and dispensing of infusions or medicinal rinsing solutions.

Previously known containers for the storage and dispensing of sterile liquids have a small capacity of at most 1 litre. When dispensing large quantities of sterile liquids, for example in peritoneal dialysis or for sterilising sterile compresses, it is therefore necessary when using infusion solution containers continually to change containers.

In addition to the extra work which is involved for the hospital staff the amount of handling involved increases the danger of infection.

Hitherto the use of large capacity containers has met with considerable difficulties because the safest method of preparing and keeping sterile infusion and rinsing solutions for medicinal purposes, namely sterilisation in flowing, superheated steam is not possible with large containers.

Steam sterilisation of large quantities of liquid cannot therefore be used because with increasing diameter of the sterilisation container the time taken for the temperature at the centre of the bulk of liquid to reach sterilisation temperature is too long for practical purposes. This has therefore a considerable detrimental effect on the economics of dispensing large quantities of liquid in large sterile containers.

It is an object of this invention therefore to avoid or at least reduce these disadvantages.

According to the invention there is provided a container made of physiologically acceptable plastics for the storage and dispensing of infusions or medicinal rinsing solutions having a capacity of at least 5 litres and being of generally flat configuration the container having a maximum depth between opposed generally flat sides of 60 mm and each of said opposed generally flat sides being provided with inwardly extending recesses or indentations connected to the other generally flat side.

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The container has great advantages. As a result of its flat design with a maximum container depth of 60 mm the heat penetration distance is reduced to 30 mm, provided that during sterilisation steam can reach the container of liquid from both sides. This also makes possible the rapid heating of large quantities of liquid. It also enables rapid cooling to take place after sterilisation. This measure also prevents caramelisation of the sugar frequently contained in the solutions. The flat container also offers considerable advantages as regards handling, as it is space saving, can be easily and economically transported and can be stacked for storage purposes. The flat design permits the assembly of several containers in a very limited space, e.g. in the form of a "battery" in very close proximity to the sick bed.

This container can be produced with various capacities above 5 litres, but the most preferred is 5 to 10 litres.

The recesses or indentations in each of the generally flat sides are advantageous both for the heat transfer and the maintenance of shape.

The recesses or indentations of one of the generally flat sides may face and be connected to the recesses or indentations of the opposing side.

Desirably the recesses or indentations in one of the generally flat sides are connected to the opposing side by welding.

The container can be provided at one end with an outlet opening having a closure member to which can be connected transfer devices for the transfer of sterile solutions or blood. Preferably the container is de-

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signed in such a way that it has a rubber stopper and preferably an air vent tube which passes through the inside of the container from the rubber stopper to the opposite end of the container, which is the highest point during emptying of the container, the rubber stopper and the air tube being designed in such a way that a venting device can be connected by piercing the rubber stopper, permitting the container to be vented in a sterile manner when it is being emptied. It is also desirable for the wall of the container at the end opposite the outlet opening to be capable of being pierced by a canula for the sterile ventilation of the container during emptying.

The present container therefore offers the possibility of direct dispensing of sterile solutions avoiding a transfer to a suitable intermediate container (e.g. irrigator), so that reinfection and the repyrogenisation linked therewith does not occur. Instead of this, the liquid can be removed by a commercially available transfer device, the container being ventilated in the manner above described.

The container is preferably made of polypropylene or polyethylene.

An embodiment by way of example of the container is subsequently described in great detail with reference to the accompanying drawing in which:—

Fig. 1 shows a sectional view of a container according to the invention on the line I—I of Fig. 2.

Fig. 2 shows a container according to Fig. 1 ready for use in a section on line II—II of Fig. 1 and

Fig. 3 shows an enlarged sectional view of the closure.

As can be seen from Figs. 1 and 2 the container 1 is flat and of rectangular shape. Along its generally flat sides 2 there are opposed recesses or indentations 3 which are welded together inside the container. The container has a countersunk handle 4 for carrying purposes.

The container is provided with an outlet opening having a closure 5 which as regards size corresponds with the closure of a blood preserving bottle according to DIN 58,361. The closure has a rubber stopper 6 which is held in place by a screw cap 7 with a small plastic tear off disc 8. The screw cap 7 and the tear off disc 8 are protected by a flanged cap 9 against unauthorised opening.

For balancing the pressure when the container is being emptied a plastic vent pipe 10 is provided, to which a sterile venting device 11 is connected when drawing off liquid. This vent pipe extends when the container is in position to be emptied into the air space above the liquid, so that the air required

for pressure equalisation does not have to bubble through the sterile solution. Furthermore direct venting is possible by inserting a venting canula 12 with connected air filter into the container air space.

The venting device 11 and the draw off unit 13 for draining the sterile liquid are connected up simply by piercing the rubber stopper 6.

#### WHAT WE CLAIM IS:—

1. A container made of physiologically acceptable plastics for the storage and dispensing of infusions or medicinal rinsing solutions having a capacity of at least 5 litres and being of generally flat configuration the container having a maximum depth between opposed generally flat sides of 60 mm and each of said opposed generally flat sides being provided with inwardly extending recesses or indentations connected to the other generally flat side.

2. A container according to Claim 1 wherein the recesses or indentations of one of the generally flat sides face and are connected to the recesses or indentations of the opposing side.

3. A container according to Claim 1 or 2 wherein the recesses or indentations of one of the generally flat sides are connected to the opposing side by welding.

4. A container according to Claim 1, 2 or 3 including an outlet opening at one end thereof provided with a closure member adapted for the connection of a liquid transfer device thereto.

5. A container according to Claim 4 wherein the closure member comprises a rubber stopper and including a vent tube extending within the container from the rubber stopper to the end of the container opposite thereto whereby a tapered cannula of a sterile venting device can be connected to the vent tube by piercing through the rubber stopper.

6. A container according to Claim 4 or 5 wherein the container wall at the end of the container opposite the outlet opening is capable of being pierced by a tapered venting cannula.

7. A container according to any one of the preceding claims made of polypropylene or polyethylene.

8. A container substantially as shown in and as hereinbefore described with reference to the accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

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